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BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

FOREST INSECT INVESTIGATIONS

REPORT OF PINE BEETLE SURVEYS on the COLVILLE NATIONAL FOREST, WASHINGTON 1931 - 1938

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October 1938

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REPORT OF PINE BEETLE SURVEYS
on the
COLVILLE NATIONAL FOREST, WASH.

1931 - 1938

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Introduction.

For many years, prior to 1931, the Bureau of Entomology and Plant Quarantine had been conducting annual surveys throughout large portions of the mature ponderosa pine forests of Oregon and California, with the cooperative assistance of the Forest Service and other forest-managing agencies, for the purpose of determining and following the trend of western pine beetle (Dendroctonus brevicomis Lec.) infestations and the need for control work against this insect. In 1931 these surveys were extended to the state of Washington by the Portland Forest Insect Laboratory and Forest Service as a part of the administrative studies program. Permanent half-section check plots were established in several forests east of the Cascade Mountains. Among the areas included in these surveys at that time was the Colville National Forest, in the northeastern quarter of the state, on which one 320-acre check plot was established in September, 1931.

This plot, in NE ¼ Sec. 35 and SE ¼ Sec. 26, T. 35 N, R. 30 E, near the Aeneas Guard Station, was located and cruised by Dr. J. A. Beal, formerly with this laboratory, assisted by members of the Colville National Forest. Until 1937, subsequent surveys on this plot were made by Dr. Beal and Messrs. W. J. Buckhorn and R. L. Furniss of the Portland Forest Insect Laboratory, with the assistance of Forest Service personnel, either Rangers J. B. Hogan and P. K. Taylor, or Mr. Moran. The 1937 survey was completed during the period of August 27-30 by a crew of five CCC Student Assistants--Messrs. R. C. Grant (crew leader), J. B. Gabriel, R. E. Geoghegan, G. M. Feil, and E. A. Brackett, employed through the office of the Regional Forester and working under the technical direction of the Portland Forest Insect Laboratory. They were directly supervised by Mr. Buckhorn. The 1938 survey was made on August 16 and 17 by a three-man crew composed of Messrs. R. M. Ramstad (crew leader), S. O. Norman, and M. Wyman, employed in the same manner as the 1937 crew and directly supervised by the writer. Although no surveys were made in either 1932 or 1934, the record of insect-caused losses on this plot was kept intact by marking the losses for these years during the following surveys.

It was not expected that the data from one check plot would be typical of, or represent, an adequate sample of western pine beetle activities over the entire Colville National Forest, even though the pine stands are not extensive. However, it was felt that these data, supplemented by general observations, would reflect the trend of forest insect infestation over the area as a whole. In

order to follow infestation trends in other portions of the forest, and to strengthen the basis for estimating ponderosa pine mortality, one new 320-acre plot, T. 36 N, R. 36 E, Sec. 29N½, near the Crowden Guard Station, was established and cruised by the 1937 crew. (For the location of these plots see Map I).

The history of the surveys on the check plots and the estimated losses for 1938, together with the general loss estimates for the Colville National Forest as a whole, are herewith presented.

Description of the Area.

The largest portions of the Colville National Forest are in Okanogan and Ferry Counties, extending from the international line south to the Colville Indian Reservation, from which it was separated in 1907. A smaller portion of the forest is located in the northwestern corner of Stevens County. The ponderosa pine stands of this area are rather limited. Data from the inventory phase of the Forest Survey* show that there are approximately 298,805 acres and 1,003,558 M board feet of commercial ponderosa pine included in all ownership classes within this Colville Area. (See Map I). Of this volume, approximately 500,000 M board feet are in types in which western pine beetle losses have been heaviest.

Infestation Data - 1930 to 1937.

A summary of the check plot cruising data is presented in Table No. 4, and the trend of the infestation is shown graphically in Chart No. 1. Western pine beetle losses on the original plot were not particularly heavy in 1930, the volume of pine killed in that year representing .93 percent of the stand. During 1931, when the effects of the severe drought period of the preceding years were being reflected in greatly reduced tree growth and tree vigor, the losses increased to epidemic proportions, and in 1932 reached their highest point since these records have been kept. In that year 3.0 percent of the stand was killed. Following the extremely low temperatures during the winter of 1932-1933, (-35 degrees F. at Republic, Wash.), losses declined rather sharply, and reached their lowest

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* Briegleb, P. A., 1937. "Forest Statistics for Okanogan County Wash." Pacific Northwest Forest Experiment Station Report.

Buell, E. D., 1937. "Forest Statistics for Ferry County, Wash." Pacific Northwest Forest Experiment Station Report.

point in 1935 when .32 percent of the stand was killed. From this low point the trend turned sharply upward in 1936, and the volume of pine killed on the original plot was approximately twice that of the previous year. However, this proved to be a temporary condition, for the losses declined in 1937 and represented only .36 percent of the stand.

The 1937 check plot cruises were supplemented by a general observational survey by the writer, but due to the poor visibility only a portion of the pine stands was examined. The Mt. Annie fire lookout tower was visited, and trips were made from Republic, Wash., over the Kettle Falls, the San Poil, and the Tonasket Highways. From this scant view of the pine types, a low endemic condition was evident, which was comparable to that on the check plots.

Infestation Data - 1938.

The current surveys were made on August 16 and 17, at which time approximately 39 percent of the probable losses were spotted and recorded. The losses estimated for 1938, based on these partially completed surveys, are slightly above the 1937 loss, and the number of trees likely to be killed represents an increase of approximately 13 percent. The relationship between these losses is shown in the following table:

Table No. 1.

Number of Trees Spotted on Check Plots

	1937 Loss		1938 Loss		
Plot	Spotted at Time of First Cruise	Total Spotted	Spotted at Time of First Cruise	Total Estimated	Remarks
Lost Creek	15	17	7	18	Increase 6%.
Growden	4	6	3	8	Increase 33%.
Total	19	23	10	26	Increase 13%.

During September another observational survey was made by the writer, the 13 Mile Mountain fire lookout tower was visited, and trips were made over the Nine Mile Creek, Hall Creek, the Cape Labelle Creek, Lost Creek, and Aeneas Valley roads. The heaviest 1938 losses noted on the Colville National Forest were in the stands bordering Aeneas Valley.

Estimated Losses for the Forest as a Whole.

Based on the results of the check plot cruises, plus the general estimates obtained from extensive surveys, an evaluation has been made of the ponderosa pine mortality caused by the western pine beetle on the Colville National Forest since 1930. These general estimates of the gross losses, together with the approximate 1938 losses, are shown in Table No. 2.

Table No. 2

Estimated Ponderosa Pine Losses on the Colville National Forest

Year of Attack	Volume of Pine Killed M.b.m.	Gross Percent of Stand Killed
1930	5,000	1.0
1931	10,000	2.0
1932	15,000	3.0
1933	5,000	1.0
1934	2,500	.5
1935	2,000	.4
1936	3,000	.6
1937	2,500	.5
Total	45,000	9.0
Mean	5,800	1.1
1938 (Tentative)	3,000	.6

Losses of Other Coniferous Tree Species.

During these surveys, the mortality of other coniferous tree species, particularly Douglas fir and western larch, has been recorded. While this has not been kept as accurately as for ponderosa pine, it is evident that other species have suffered rather heavily from insect attacks during the same period. A summary of these losses is presented in the following table:

Table No. 3

Mortality of Other Species
on the Lost Creek Plot

Year of Attack	Douglas Fir		Western Larch		Lodgepole Pine	
	Trees	Volume	Trees	Volume	Trees	Volume
1931	18	12,570	2	1,070	-	-
1932	2	1,160	-	-	-	-
1933	32	12,480	16	5,020	1	180
1934	4	1,110	21	6,100	-	-
1935	8	1,340	7	3,400	-	-
1936	4	660	-	-	-	-
1937	(Not recorded)					

Recommendations.

Although the current check plot surveys indicated that the western pine beetle infestation had increased slightly over that of the previous year, the losses represent a low endemic condition and no control measures are warranted. Both plots should be respotted during 1939 in order to furnish additional data on bark beetle activity in two widely separated units of this forest. The pine stands bordering Aeneas Valley, in which the heaviest 1938 losses were noted, should be examined during 1939 to determine whether these losses increased during the late summer.

Table No. 4

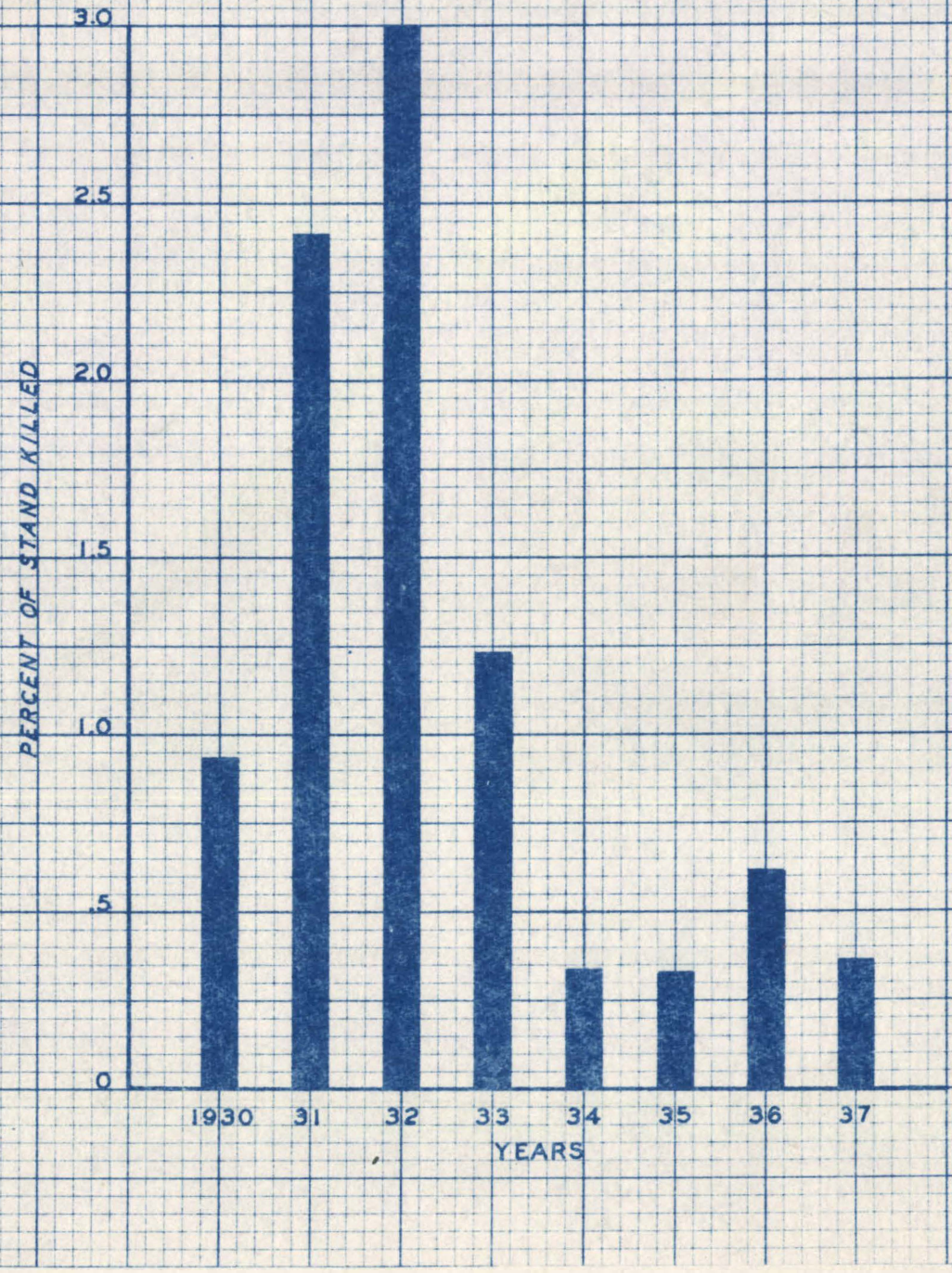
Annual Ponderosa Pine Mortality on Check Plots
Colville National Forest, Washington

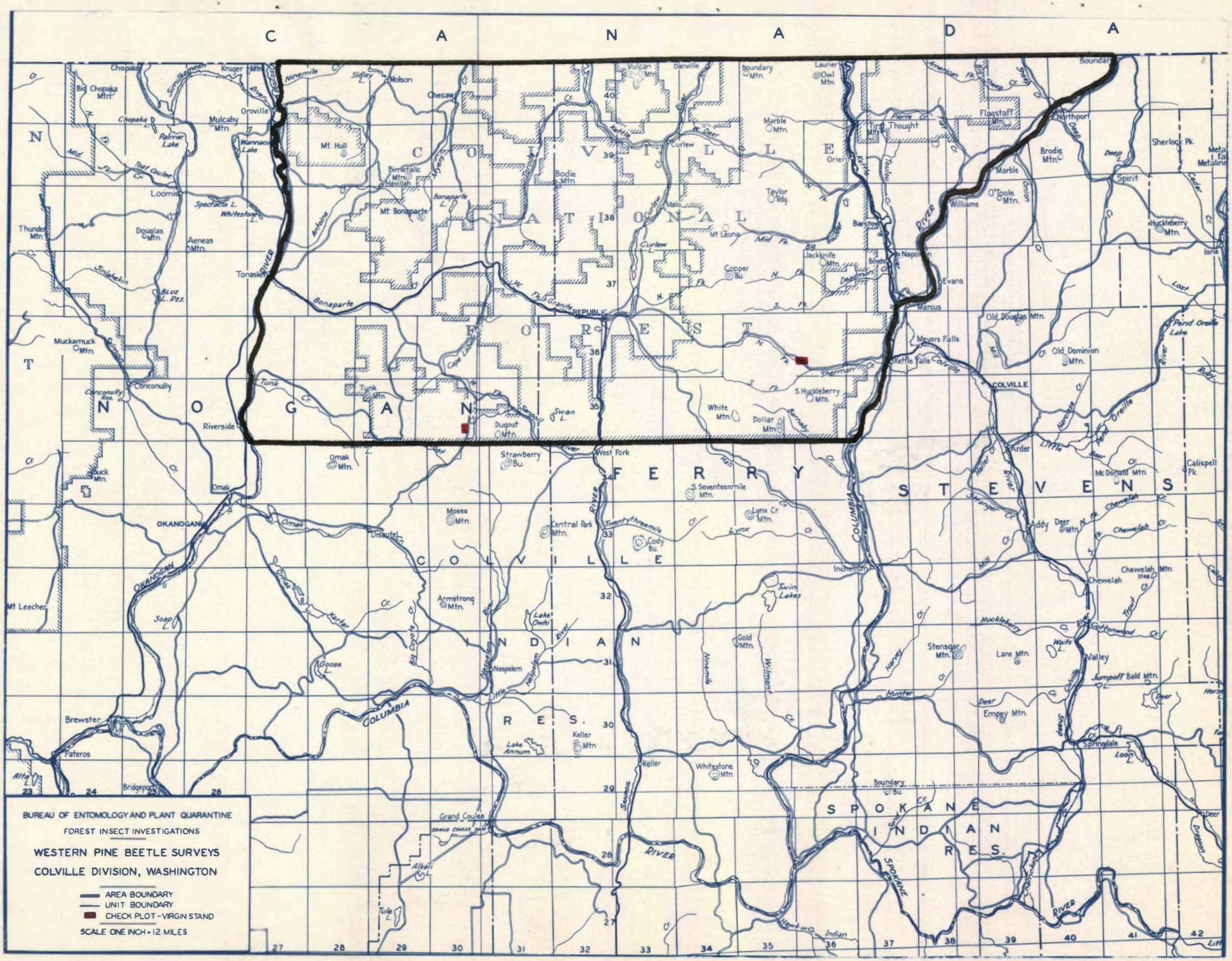
Area and Plot Location	Pine Timbered Acres and 1931 Stand Volume	Site	Insect Losses: Year of Attack	Trees Killed	Volume Killed	Bd.ft. per Acre.	Gross Percent of Stand
			1930	38	21,900	65	.93
			1931	54	57,420	179	2.42
Aeneas			1932	84	70,650	221	3.00
			1933	40	28,910	87	1.22
T. 35N, R. 30E,	320		1934	21	8,040	25	.34
Sec. 26 SE¼	2,370 M.b.m.	4	1935	18	7,550	24	.32
Sec. 35 NE¼			1936	20	14,500	45	.61
			1937	17	11,430	48	.36
			Total	292	220,400	694	9.20
			Mean	36	27,500	87	1.15
Kettle Falls							
T. 36N, R. 36E,	270	4	1937	6	6,100	23	.40
Sec. 29N½	1,506 M.b.m.						

CHART NO.1

TREND OF WESTERN PINE BEETLE LOSSES
ON ONE CHECK PLOT

COLVILLE NATIONAL FOREST, WASHINGTON




C A N A D A
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
FOREST INSECT INVESTIGATIONS
WESTERN PINE BEETLE SURVEYS
COLVILLE DIVISION, WASHINGTON
AREA BOUNDARY
UNIT BOUNDARY
CHECK PLOT - VIRGIN STAND
SCALE ONE INCH = 12 MILES
COLVILLE NATIONAL FOREST
OKANOGAN
FERRY
STEVENS
COLVILLE
INDIAN RES.
SPOKANE INDIAN RES.
COLUMBIA RIVER
OKANOGAN RIVER
SPOKANE RIVER
Chopaka
Oroville
Loomis
Tonasket
Riverside
Omak
Conconully
Brewster
Pateros
Republic
Kettle Falls
Colville
Chewelah
Valley
Springdale
Northport
Spirit
Evans
Marcus
Inchelium
Nespelem
Keller
Grand Coulee
Bridgeport